

University of Groningen

## Nederlandse ingenieurs en de fortificatiewerken in het eerste tijdperk van de Tachtigjarige Oorlog, 1573-1604

Westra, Frans

**IMPORTANT NOTE:** You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

*Document Version*

Publisher's PDF, also known as Version of record

*Publication date:*

1992

[Link to publication in University of Groningen/UMCG research database](#)

*Citation for published version (APA):*

Westra, F. (1992). *Nederlandse ingenieurs en de fortificatiewerken in het eerste tijdperk van de Tachtigjarige Oorlog, 1573-1604*. s.n.

### Copyright

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

### Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.

## Summary

### **Dutch engineers and the fortifications in the first period of the Eighty Years War, 1573-1604**

Due to legislation the major part of the fortifications in the Netherlands was demolished in the last quarter of the nineteenth century. The industrial revolution required more space for factories and for an infrastructure of railroads and canals. In many fast growing cities, such as Utrecht, the walls were transformed into parks and boulevards. In smaller towns, such as Enkhuizen, the fortifications remained intact. In the 20th century, especially after the Second World War, some Dutch strongholds were entirely reconstructed, for example Naarden, Heusden and, most recently, Bourtange.

The greater part of the Dutch fortifications originated in the 16th century, with Simon Stevin and Adriaan Anthoniszoon being well-known constructors, the former as theorist and tutor of prince Maurice and the latter as the 'patriarch' of Dutch fortificators. It is however wrong to suppose that all these fortifications were built by only a few engineers.

Although there have been several publications in recent years which have uncovered details about the activities of Dutch engineers during the Eighty Years War, an integrated history of Dutch engineers was written only about the nineteenth century. This current book intends to meet Charles Duffy's complaint, in his book about siege warfare, about the fact that so little was heard until now about individual Dutch engineers in the 1570s and 1580s.

The profession of engineer was nevertheless much older. Since classical times there are reports of engineers and their activities. After the fall of the Roman Empire the period of the migration of the nations in western Europe undermined the faith in fortifications. Under the government of Charlemagne the building material for fortifications was even used for the construction of cathedrals. But the expeditions of the Vikings and the political disintegration of the empire of Charlemagne witnessed a renewed interest in fortifications, and the rise of the power of cities and small states also proved an incentive for building walls and fortresses. The word engineer began to occur in the vernacular as well as in Latin in England, France, Spain and Italy during the 12th century. Particularly in Italy there were rapid

developments in fortifications and it was here that the pentagonal bastion, which originated from Byzantium, came into use in the beginning of the 16th century. During the first half of the 16th century there were probably some hundreds of engineers working in the Italian territories. In Germany Albrecht Dürer was the first to publish about fortifications, but the most famous engineer and influential writer about military architecture was Daniel Speckle from Strasbourg. Around the year 1540, however, Italian engineers began to replace German military architects, as for instance the famous Alessandro Pasqualini. At about the same time in Austria, which was important as a stronghold against the Turks, Italian engineers worked on fortifications in Vienna.

In England and France similar developments can be noticed. Local constructors were replaced by Italian engineers, or at least were engaged because of their expertise. Some very important engineers gained their training through working on Malta, which was constantly under threat from the Turkish enemy. Some of these important engineers played a prominent role in the Spanish army in the Netherlands. As for Spain and Portugal, little is known about domestic engineering. Even in the Spanish colonies in Central America Italian engineers were employed. Portugal was not renowned for skilled engineers, which was the reason, according to the English envoy, Rogers, that the country was conquered by Spain in 1580. In the Netherlands the building of walls began around the year 1300. This work was carried out by architects, constructors or carpenters. The first ones to construct fortifications were several members of the famous Keldermans family of Malines in the southern Netherlands. In addition, in the first half of the 16th century, fortifications were built in the town of Utrecht by Jean de Termonde and Willem van Noort, whose son and grandson succeeded him as municipal architect of Utrecht.

From 1540 onwards, as a result of a fortification program issued by the emperor Charles V, constant work ensued on fortifications in the Netherlands. One of the principal engineers was Sebastian van Noyen, whose activities were concentrated near the French border. His nephew Jacques van Noyen was his successor around the year 1560. Apart from these Dutch or Flemish architects and engineers, several Italian engineers were also engaged for for-

tifications in the Netherlands. In Antwerp Donato de Buoni Pellezuoli constructed new walls from 1542 onwards. The aforementioned Alessandro Pasqualini also worked in the towns of 's-Hertogenbosch, Kampen, Middelburg, Utrecht and Amsterdam. His colleague Marco di Verona was active in Luxemburg, Amsterdam and Groningen, where he was brutally murdered by locals because of a quarrel in a pub.

The most prominent Italian engineers were serving in the Spanish army that, under the duke of Alva, was supposed to subdue the unrest in the northern provinces of the Netherlands. Under the duke, and his successors Alessandro Farnese, Luis de Requesens and Ambrosio Spinola, an impressive number of engineers played a leading role in the successive sieges from Haarlem (1573) to Ostend (1601-1604). Apart from these there were also Dutch engineers serving the Spanish army, such as Joost Janszoon who was an architect in Amsterdam and worked on the Spanish side during the siege of Leiden (1574). Another example was the engineer Hans Hanker who defected from the troops of prince Maurice and commanded the construction of the important fortress of St. Andries in 1599. In total, the Spanish army could dispose of some sixty engineers between 1573 and 1604, of whom fifteen were Dutch or Flemish. It was this potential which had to be matched by the Dutch engineers in the revolutionary provinces.

In the southern Netherlands, after the first signs of the revolt against Spain, there was a situation of transition. For example, the Estates-General in The Hague engaged the engineer Jean Schilde, who still called himself 'engineer of His Royal Majesty', meaning the king of Spain. William of Orange also worked with Italian engineers such as Battista Grimaldi and Aurelio de Pasino. In 1579 the latter published a book on fortifications and military architecture which was to serve the rebels in their defense against Spain. From 1577 onwards Jacques van Noyen, who formerly used to work for Margaretha of Parma, was employed by the Estates-General and fortified several towns in the southern Netherlands. The Dutch engineers Hans Duyck and Matthijs Tasson were employed in the cities in West-Flanders. During the siege of Maastricht in 1578 and 1579 the engineer Sebastiaan Tapijn was in charge of the defense of the town against Parma's troops. In Antwerp the major part of the fortifications was devised by an engineer called Abraham Andriessen. In the year 1572 he still worked for the Spanish king. In his company the famous architect Hans Vredeman de Vries was working as an engineer and was responsible for

several works of fortification. Two other Dutch engineers were also active in the years 1584 and 1585 in and around Antwerp. Anthony van der Vate and Pieter Timmermans fortified several strongholds along the river Schelde north of Antwerp, and constructed several floating war machines which were intended to break the siege of Antwerp by the duke of Parma. Illustrative of this situation of transition was the fact that Abraham Andriessen drafted the new major fortress of Willemstad in west Brabant, but returned into Spanish service following the capitulation of Antwerp in 1585, as did Jacques van Noyen. The other engineers either left the service or moved to Holland and Zeeland in order to assist their colleagues in the struggle against Spain. The only Italian engineer who still continued to work for the Estates-General, Frederico Genibelli, pursued his career in England. Ostend remained the only place in Flanders that was virtually held by the Dutch rebels after the capitulation of Antwerp and here the engineer Matthijs Tasson was in charge of the fortifications until the famous siege in the years 1601-1604.

In the northern Netherlands the beginning of new fortifications on a grand scale occurred in the year 1573. Following the loss of Haarlem it was obvious that the fortifications in all essential towns had to be renewed and modernized. William of Orange had inspected several cities in 1572 and 1573 and from 1574 onwards he began to appoint fortification-masters and engineers. In the province of Zeeland Germain Le Febvre, Pieter Timmermans and Abraham Andriessen were entrusted with the task of modernizing the fortifications, with Adriaan Anthoniszoon, Hans Duyck and Leon de Futere being appointed in Holland. In Amsterdam the architect Joost Janszoon began to work for the United Provinces in 1577, although he had witnessed the siege of Leiden in 1574 as an engineer on the Spanish side. In the province of Utrecht, the architect and engineer Cornelis Bloemaert, along with several less important engineers, began to work in the Dutch army at the fortress of Vredenburg in 1576. In the eastern and northern parts of the Netherlands, several engineers and fortification-masters began their fortification-work in 1577. With the start of the fortification of Coevorden and Bourtange on the north-eastern boundaries of the revolutionary provinces around 1580, engineers were working in the entire realm under control of the Estates-General. The most prominent engineer was Adriaan Anthoniszoon. Due to the imminent siege of Alkmaar in 1573 he had been requested to build four new

major bulwarks on the outer side of the city walls. In combination with hydrographic measures, this proved to be sufficient to repulse the Spanish enemy, and its retreat from Alkmaar was hailed as a great success in the revolutionary provinces. This also made Anthoniszoon very famous, and he began to fortify all over the northern Netherlands. Although he continued to be addressed as a surveyor, in the year 1579, when he was about to begin fortifying the stronghold of Muiden, he was cited as 'engineer' for the first time. In the next year he was asked to advise about fortifications in Friesland, but his activities also stretched as far as Zeeland. Apart from the defense of Alkmaar in 1573, however, he only once visited a siege, which was when prince Maurice attempted to conquer the town of Geertruidenberg in 1593. His main objective was to renew and extend the fortifications of towns won by prince Maurice and count William Louis. Once taken over from the Spaniards, Anthoniszoon would come, inspect the fortifications, draft new projects, and mark out the new bulwarks. With the notable exception of Groningen, there is almost no town to be found in the revolutionary provinces where he did not work. In 1595 he fell ill and requested the Estates-General for assistance from one of his sons in future projects.

This was granted and he continued fortifying until the year 1607, when he had reached the age of 66. It is obvious that Adriaan Anthoniszoon could not handle all fortifications in the Netherlands, although he had been fortifying some 75 towns and strongholds. In the 1580s he gained the support from three prominent engineers in different parts of the country. In the central area around the big rivers, Jacob Kemp, a bailiff from Gorcum, began his career as an eminent engineer. His career ended in 1595 whilst besieging the town of Grol (Groenlo) in Gelderland. In Zeeland the engineer Johan van Rijswijck began a longlasting career which continued until after the year 1600 and which finally ended in Germany. In the northern regions count William Louis assured himself of the services of the engineer Joost Mattheus, who had fled the town of Aalst in 1576 following the sack and the massacre by the Spaniards. Although his activities have been least well documented, he nevertheless played a prominent role in the so-called war of the redoubts, which culminated in the reconquest of the town of Groningen in 1594. Unfortunately, he was shot and died in 1593, while observing the possibilities for a siege of the castle of Wedde in eastern Groningen. both Joost Mattheus and Jacob Kemp became very famous when they applied new techniques of dig-

ging at the siege of Steenwijk in 1592.

Johan van Rijswijck's highlight was the draft for the entrenchment of the Estates-General in Groningen, which was constructed in the year 1600.

The constant activity of fortification in the northern Netherlands required more engineers than those mentioned above. While there were six engineers employed in the year 1575, this had risen to a total of 27 engineers serving the revolutionary provinces in 1598. Among these several achieved prominence, such as Nicolaes de Kemp, who entered the service in 1593 and who was initiated in the secrets of fortification by Adriaan Anthoniszoon, Jacob Kemp and Johan van Rijswijck. In 1595 Jan Lenaerts succeeded Jacob Kemp, but he was severely wounded in 1598. The engineer Andries de Roy, who was also very important, started his career as a mason in Willemstad and was finally killed in 1602 at the siege of Grave. In the northern regions the engineers Jetze Iges and Pauwel Symons succeeded Joost Mattheus. In Zeeland David van Orliens became the most important engineer following the departure of Johan van Rijswijck to Germany around the year 1600. Van Orliens could have learned a lot from Simon Stevin, with whom he cooperated in Harderwijk in 1598 and 1599. This was Stevin's first actual activity in the field as an engineer, although in 1594 he had already published *De Sterctenbouwing*, the first book in Dutch about fortifications. Stevin also made plans for the fortification of the stronghold of IJzendijke in Zeeuws-Vlaanderen, which had been conquered by prince Maurice and count William Louis in 1604, and a map of his plans still remains in the archives of the Estates-General. An instruction about fortification by prince Maurice for the engineers at IJzendijke has also survived the years (including the bombardment of Middelburg during the Second World War). Apart from fortifications in Arnhem, however, no other activities of Stevin as an engineer have been documented.

The ultimate confrontation between Spanish and Dutch engineers before the Twelve Years' Truce took place at the siege of Ostend in the years 1601-1604. This siege, which was typified by contemporary writers as an 'academy' for engineers, involved the work of twelve engineers on the Dutch side; of whom seven were killed. Among the survivors was an English engineer, Raeff Dexter. The town eventually had to capitulate in 1604, which meant the loss of the last big town in Flanders for the rebels against Spain, but the consequent conquest of Zeeuws-Vlaanderen made it possible to continue with the blockade of Antwerp.

The Dutch engineers during the first half of the



Eighty Years War were in general employed by the Estates-General, the States of the provinces, or by municipal authorities. In addition, prince William, prince Maurice and count William Louis also appointed engineers. From the beginning of the revolt in the Netherlands, prince William had played an active part in the appointment of engineers. His son, prince Maurice, was stimulated by his uncle, count William Louis, and by Simon Stevin, to cultivate a well qualified corps of engineers. The siege of Steenwijk (1592), which was virtually won by the engineers, proved particularly important and provided the incentive for the training of engineers. The importance of engineering was also underlined by the loss of the town of Hulst in 1596. By 1598 the town of Breda was seriously threatened by the Spanish enemy, which prompted prince Maurice to provide the city with food supplies, ample ammunition, a garrison, and last, but not least, 'qualified engineers'. The need for educating engineers culminated in the institution of the school of engineers as a department of Leiden university by prince Maurice in the year 1600. At the same time the study of mathematics at Franeker university was expanded to include lessons in fortification, these being given by Adriaan Metius, a son of Adriaan Anthoniszoon. This expansion was carried out on the instigation of count William Louis.

The formidable achievements of the Dutch engineers did not remain unnoticed abroad, and from about 1590 requests were made by foreign sovereigns to bid for the services of Dutch engineers. Antonius van Opberghen and Simon Stevin were working in the areas around Dantzic before 1600, and after this year at least three Dutch engineers transferred their activities abroad. Johan van Rijswijck fortified German towns and strongholds such as Mannheim, Heidelberg, Wülzburg, Ulm, Bremen, Hamburg, Lübeck, Wesel and Lippstadt, where he became chief engineer of the count of Lippe. The Frisian engineer, Jetze Iges, also worked for the count of Lippe, following the completion of his duties at the entrenchment of Groningen. The engineer Nicolaes de Kemp was employed in 1602 by the count of the Mark of Brandenburg. His activities reached as far as Pommern and Prussia, where he fortified in Pillau, Johannisburg and Neidenburg. In 1603 he inspected the stronghold of Driesen (currently in Poland). After a short intermezzo in the Netherlands he entered the service of the Swedish king, Charles XI, and began to build bulwarks in Göteborg.

The education of engineers at Leiden university

had begun in the meantime. In 1600 the training was initiated and teaching was done in the Dutch language. The pupils were first supposed to take theoretical lessons in surveying and mathematics. Once they were able to measure and draw in scale, they were then sent out to the field to bring their knowledge into practice. Apart from that they had to devise models of fortifications in clay and wood and they had to make drafts of fortifications on paper. The teaching was carried out by two lecturers or professors, the most important of whom was Ludolph van Ceulen, who used to teach mathematics in private schools before he was engaged by Leiden university. He gave all the theoretical and mathematics lectures to the students of the school of engineers. He was seconded by Symon Franszoon van Merwen, who had occupied several public functions in the city of Leiden and who had begun his career as a surveyor. As master of public works he had met Adriaan Anthoniszoon and had also worked on new fortifications at Leiden. Because of lack of archives, however, there is little that can be said about the student population. One request, made by the students presumably in 1610, indicates that the majority had a background as artisans, for instance masons or carpenters. The first student of the school of engineers who was officially enlisted in the Dutch army as an engineer was Pieter Bilderbeeck in the year 1630. Nevertheless, in 1614, prince Maurice showed himself to be very happy with the results of the school, when he declared that several students had become useful engineers.

In the first years of the revolt of the Netherlands against Spain, the rebels could not dispose of engineers other than the ones who had already served for Spain in the southern Netherlands. During the siege of Haarlem in 1573 a shrewd worker had to be used as an engineer, and during the siege of Zierikzee the engineer Germain Le Febvre did not have time enough to prepare new fortifications. In Holland, Adriaan Anthoniszoon was the first to develop the profession of engineer, and in 1574 the first new engineers were appointed by prince William. If we look at a group of fifty engineers during the period 1573-1604 it is apparent that details about background and education are totally unknown in fourteen of these cases. Four of them had occupied public functions in the towns, and eleven had been artisans prior to becoming engineers. Six had been surveyors and eleven had occupied a military rank. One had been wallmaster and three had been engineers for the Spanish enemy. Most extraordinary was the case of Simon Stevin and Hans Vre-

deman de Vries, who had been architects or mathematicians before they began to work as practical engineers. If we look at the four most important engineers, we can see that Adriaan Anthoniszoon had been a surveyor, Jacob Kemp a bailiff, Johan van Rijswijck a nobleman and governor of the stronghold of Grave, and Joost Mattheus a refugee from the southern Netherlands and probably a manufacturer of staircases. This must lead to the conclusion that most of the appointments were prompted by pragmatic motives. The work of engineer consisted of the inspecting of fortifications, making plans for improvement, drawing maps, making calculations, and organizing the construction. Apart from form and technique, this work had a great similarity to the work on the dikes, in which the Dutch were already famous. It is very hard to give a concise definition of an engineer for the last quarter of the 16th century in the Netherlands, in that those who were referred to as engineers included civil engineers and persons who worked on inventions. But more than three-quarters of the persons who were called engineers were working on fortifications. Apart from studying these fortifications themselves, we can also

study the drafts for the fortifications, which were made by the engineers. We have knowledge of some 55 maps, eight of which were unfortunately destroyed during the Second World War. By studying these maps and comparing them with older maps it must be concluded that the secret of the Dutch fortifications lay in the size of the bulwarks and in the fact that they were made from earth. The use of engineers for offensive purposes led to sophisticated ways of digging and approaching the besieged towns, so that walls could be easily undermined, and the importance of expensive cannons was reduced as a result of these techniques. Finally the Dutch engineers were very well paid, the most prominent of them earning a salary comparable to that of a university professor. They were also vital for good progress in the war and were engaged in what was a very dangerous profession. Their prestige was more determined by their profession than by their education, and their achievements played a major role in the course of events during the Eighty Years War.

(Corrected by Peter Mair).